3.2 Medical Requirements Overview

TABLE 3.2: MEDICAL REQUIREMENTS OVERVIEW

MRID# and Title:	Radiation Monitoring/Crew Personal Dosimetry
Sponsor:	Medical Operations
Discipline:	Radiation
Category:	Medical Requirements
References:	SSP 50260 ISS Medical Operations Requirement Document SSP 50667 Med Volume B, Section 3.1
Purpose/Objectives:	• To monitor and document crew exposure to radiation and to maintain crew exposures "as low as reasonable achievable". • To perform risk assessment.
Measurement Parameters:	Radiation exposure
Deliverables:	• Record of radiation doses used to document occupational exposure. • Doses from each mission and accumulated doses, which shall be used for health risk assessment, are to be recorded in crewmembers' medical records.
Flight Duration:	All flights
Number of Flights:	All flights
Number and Type of Crew Members Required:	ISS crewmembers (Primary and backup will be trained)
Other Flight Characteristics:	N/A

3.3 Preflight Training

TABLE 3.3: PREFLIGHT TRAINING

Preflight Training Activity Description:	Training will be covered in the following Radiation lesson: (ISS): Radiation Operations			
Schedule:	**Duration:**	**Schedule:**	**Flexibility:**	**Personnel Required:**
	Radiation Operations 45 min	L-19 months	N/A	Crew/Instructors
Ground Support Requirements Hardware/Software	**Preflight Hardware:**	**Preflight Software:**	**Test Location:**	
	Crew Passive Dosimeters (CPDs)	N/A	U.S.	
Training Facilities	**Minimum Room Dimensions:**	**Number of Electrical Outlets:**	**Temperature Requirements:**	**Special Lighting:**
	Conference Room	N/A	Ambient	N/A
	Hot or Cold Running Water:	**Privacy Requirements:**	**Other:**	
	N/A	N/A	Overhead projector	
Constraints/Special Requirements:	N/A			
Launch Delay Requirements:	Training will be repeated if requested by the crewmember.			
Notes:	None			

3.4 Preflight Activities

Preflight Activity Description:	No crew activities			
	Duration:	**Schedule:**	**Flexibility:**	**Personnel Required:**
Schedule:	N/A	N/A	N/A	N/A
Ground Support Requirements Hardware/Software	**Preflight Hardware:**	**Preflight Software:**	**Test Location:**	
	N/A	N/A	N/A	
Constraints/Special Requirements:	When transporting hardware to launch location, hardware should not be x-rayed or stowed/shipped with radioactive material. Dosimeters should be transported inside lead-lined bags. If X-ray is necessary for security, the dosimeters must be kept inside the lead-lined bags and the number of X-rays should be recorded.			
Notes:	N/A			
Launch Delay Requirements:	If a launch delay of more than 90 days occurs, Space Radiation Analysis Group (SRAG) will decide whether to refurbish, replace, or take no action.			
Data Delivery	None			

3.5 In-Flight Activities

TABLE 3.5.1: IN-FLIGHT ACTIVITIES

<table>
<tr><td>In-Flight Activity
Description:</td><td colspan="5">The Crew Passive Dosimeters (CPDs) are preintegrated into the habitation module and the crewmembers retrieve them post insertion (about 2 hours into flight) Each crewmember is required to carry his/her CPD continuously, including during EVAs. Prior to descent, crewmembers are to stow the CPDs in the Sokol suit or coveralls where they will be recovered at landing.</td></tr>
<tr><td>Schedule:</td><td>Activity:</td><td>Duration:</td><td>Schedule:</td><td>Flexibility:</td><td>Personnel Required:</td></tr>
<tr><td></td><td>Crew Passive Dosimeter</td><td>Continuous monitoring</td><td>Worn continuously during the mission, including ascent and .EVAs.</td><td>N/A</td><td>All U.S. crewmembers and IP crewmembers by agreement</td></tr>
<tr><td>Procedures:</td><td colspan="5">N/A</td></tr>
<tr><td>Constraints / Special Requirements:</td><td colspan="5">Scrub turnaround = If a launch delay of more than 90 days occurs, Space Radiation Analysis Group (SRAG) will decide whether to refurbish, replace, or take no action.
Each crewmember will be supplied with a crew passive dosimeter for continuous use for every mission. Dosimeters shall be worn during EVAs.</td></tr>
<tr><td>Photo / TV Requirements:</td><td colspan="5">N/A</td></tr>
<tr><td>Cold Stowage Requirements:</td><td colspan="5">N/A</td></tr>
<tr><td>Mission Extension Requirements:</td><td colspan="5">N/A</td></tr>
<tr><td>Notes:</td><td colspan="5">Resupply Requirements: At launch each crewmember will be supplied with a crew passive dosimeter (CPD) for continuous wear.</td></tr>
<tr><td>Landing Wave-Off Requirements:</td><td colspan="5">N/A</td></tr>
<tr><td>Data Delivery</td><td colspan="5">A final report containing analytical results of CPDs will be delivered to the Radiation Health Officer (RHO) at 30 days from receiving of the CPDs at the Space Radiation Dosimetry Laboratory. The RHO will submit a mission final report to the Flight Surgeon and Medical Operations 14 days after both CPD and all necessary radiation monitor reports (e.g. RAM reports) are received from SRAG.</td></tr>
</table>

TABLE 3.5.2: IN-FLIGHT HARDWARE

Hardware/Software Name
Crew Passive Dosimeter (CPD)

3.6 Postflight Activities

TABLE 3.6: POSTFLIGHT ACTIVITIES -

Postflight Activity	Crewmembers returning via Soyuz will have their dosimeters returned via flight surgeons.			
Description:	**Duration:**	**Schedule:**	**Flexibility:**	**Personnel Required:**
Schedule:	N/A	R+0	N/A	Flight Surgeons and landing team
Ground Support Requirements Hardware/Software	**Postflight Hardware:**	**Postflight Software:**	**Test Location:**	
	N/A	N/A	N/A	
Constraints/Special Requirements:	Upon the return of hardware, hardware should not be x-rayed or stowed/shipped with radioactive material. Dosimeters should be transported inside lead-lined bags. If X-ray is necessary for security, the dosimeters must be kept inside the lead-lined bags and the number of X-rays should be recorded.			
Early Destow / Early Return:	N/A			
Notes:	N/A			
Data Delivery	**Data/Report to Designated Recipients (Nominal/Contingency** A final report containing analytical results of CPDs will be delivered to the Radiation Health Officer (RHO) 30 days after the CPDs are received at the Space Radiation Dosimetry Laboratory (SRDL). **Mission Summary Report** The RHO will submit a preliminary or final mission dosimetry and risk report to the Flight Surgeon and Medical Operations at R+ 60 days. A final report will be issued within 14 days after all physical dosimetry data are received from the SRDL.			

3.7 Summary Schedule

TABLE 3.7: SUMMARY SCHEDULE

ACTIVITY	DURATION	SCHEDULE	FLEXIBILITY	PERSONNEL REQUIRED	CONSTRAINTS
Preflight Training					
Radiation Operations	45 min	L-19 months	N/A	Crew/ Instructors	None
Preflight – N/A					
In-Flight					
Ascent: Crew Passive Dosimeter	Worn continuously during the mission, including ascent and EVAs	Continuous monitoring	N/A	All U.S. Crewmembers and IP crewmembers by agreement	Continuous monitoring
Postflight – N/A					
Postflight Debrief – N/A					